

Nov. 1875. *Rear-Admiral Davis, On Mars and Jupiter.*

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have interchanged; but, of course, the longitude of Madras must be determined by telegraph, and then there will be some correction, and I may vary the amount by a few hundredths of a second of time from small corrections which have not been included by Mr. Pogson.

If the terms for longitude and solar parallax (which, by-the-by, has been assumed as  $8''.93$ ,  $\log.=0.95085$ ) be left out, then the probable error of the R.A is  $\pm 0''.312$ , and of N.P.D.  $\pm 0''.443$ .

Roorkee, October 14, 1875.

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*On an Old Drawing of the Sun. Translation from a Letter from Signor Capello, Director of the Observatory at Lisbon, to Dr. De La Rue.*

I take the liberty of sending you a photographic copy of an allegorical plate representing the Sun, by Sheiner and Kircher, published at Rome in 1635.

I do not know to what work the plate belongs. I have not met with it in the *Rosa Ursina*, nor in the other works of Sheiner or Kircher.

Looking at this plate, one would be tempted to believe that the observers in question were already acquainted with the Protuberances and the Photosphere.

The clouds or fumarols all round the solar disk may very well represent the Protuberances, and the series of little tongues of fire may also very well represent the Photosphere. At any rate, it is an extraordinary coincidence, for both of them are quite recent discoveries.

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*Drawings of Mars and Jupiter, made with the 26-inch Equatoreal of the United States Naval Observatory.\**

(Communicated by Rear-Admiral C. H. Davis, U.S. N. Supt.)

### I.

These drawings were made with coloured chalk crayons on ordinary crayon paper in the following way. A circle three inches in diameter was first drawn in lead pencil on a small piece of the crayon paper, and this was secured to a small board, which was convenient to hold in the hand. The Washington mean time of beginning the drawing was (usually) noted to the

\* The drawings are preserved, and may be inspected in the Library of the Society.—ED.

nearest minute, and the drawing was begun by sketching in the most prominent lines, the details of the central parts being next filled in, and those of the extreme zones last. The time of the ending of the drawing was then noted, and a careful comparison of the completed drawings made with nature, and a few alterations made. The actual features of the drawing usually correspond to the mean of the times of beginning and ending. No account was taken of the elliptic form of the disk, as the drawings were regarded peculiarly as studies of the central parts of the disk, both as to forms and colours, though quite as much pains was taken with the extreme portions. The work was done with the full aperture, 26 inches, and usually with a positive eye-piece magnifying 400 diameters. The other and more important work of the telescope forbade the removal of the filar micrometer, and the insertion of a glass plate ruled into squares, as was originally proposed, so that the positions of the bands, &c., are merely careful eye estimates. Particular attention was paid to studies of the colours of the disk; and although the drawings are quite unsatisfactory in this respect, owing to the want of skill of the observer, and the difficulty of obtaining proper crayons, it has been attempted to supplement the drawing by verbal descriptions. Standards of colour have been sought for; one of the most satisfactory has been indicated by Prof. Cleveland Abbe, of the United States Signal Service. The horizon is frequently surrounded on the hot summer days, in the middle portions of the United States, with piles of cumulus clouds, among which (in the recesses near the bases, and occasionally on the surfaces), may be found a reddish or salmon colour, which is quite similar in tint and intensity to the normal colour of *Jupiter's* main belt during 1875. It has been noticed with some surprise that the same reddish salmon colour is the prevailing tint of *Mars*, except that this red is more glaring and strong. After many trials it was found that the best results for colour were obtained by using the *same* crayon for drawings of both *Mars* and *Jupiter*. Owing to the low altitude of *Mars*, drawings of this planet were soon abandoned, in spite of his otherwise favourable position.

## II.

### *Description of the Photographs.*

By a misapprehension the photographer has photographed not only the drawing, but a narrow space about it. In all cases the pencil border of the drawing shows in the photograph, and is the true limit. Any marks beyond this are simply portions of the crayon dust rubbed over this line in the process of drawing, except in the case of the egress of satellites, &c., which cases can be easily distinguished. The photographs show *only* the forms; the relative blackness of the various pictures is not at all kept in the different photographs.

## III.

*Detailed Descriptions of the Drawings of Mars.*

Drawing No. 1. 1875, June 14. Observer, Holden.  $11^h 15^m$  to  $30^m$ ; bad seeing; 400 magnifying power. I see no polar white; sketch made with power of 175; image very poor; sketch finished  $11^h 38^m$ . The border around the reddish and black parts should be a yellowish red. Some of the details put in with power 400.

Drawing No. 2. 1875, June 16. Observer, Holden. Begun  $10^h 40^m$ , finished  $11^h 15^m$ ; magnifying power 400. Slight indications of polar snow, especially at south pole. The whole southern hemisphere unsatisfactorily drawn. It is full of delicate detail, hard to represent.

Drawing No. 3. 1875, June 21. Observer, Holden. Mere sketch finished  $10^h 45^m$ ; magnifying power 400. *Mars* so low that it is very unsteady. I have noticed several times small *white* projections from the limb near the south pole. They are so unsteady that I cannot draw them. I should call them *round*, and brilliant white.

Drawing No. 4. 1875, June 23 (2 drawings). Observer, Holden. Magnifying power 400 (1st); from  $10^h 15^m$  to  $10^h 37^m$ . Seeing bad at first, but suddenly becomes better. First drawing left unfinished and No. 2 begun. Second drawing begun  $10^h 20^m$ , finished  $11^h 7^m$ . Seeing much better than any other drawing of *Mars* this year.

Drawing No. 5. 1875, August 5. Observer, Holden. Magnifying power 400; begun  $8^h 20^m$ , ended  $8^h 47^m$ . Whole drawing unsatisfactory, but a few things certain. South pole quite white, north pole somewhat so. A small projection near south pole, at or about *a*; forms on the disk not well caught. Red colour satisfactory; none of the rest quite so. From *a* to *b* a long bright yellow edge to the disk; that is, inside the border.

## IV.

*Detailed Description of the Drawings of Jupiter.*

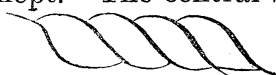

Drawing No. 1. 1875, June 9. Observer, Holden. Magnifying power 400. Imperfect sketch, finished  $9^h 30^m$ .

Drawing No. 2. 1875, June 10. Observer, Holden. 2 imperfect sketches: No. 1.  $8^h 20^m$  to  $8^h 35^m$ ; No. 2.  $8^h 35^m$  to  $8^h 46^m$ .

Drawing No. 3. 1875, June 16. Observer, Holden. Magnifying power 400; drawing finished at about  $9^h 55^m$ . Seeing not good, but image fairly seen at times.

Drawing No. 4. 1875, June 18. Observer, Holden. Magnifying power 400; begun  $7^h 55^m$ , finished  $8^h 22^m$ . The atmo-

sphere is hazy, but image steady. The whole planet has a yellow tinge from the haze, which is not kept in the drawing. The red is too red, and the slate colour too bright and too marked; but the cloud forms are well kept.

Drawing No. 5. 1875, June 21. Observer, Holden. Magnifying power 400; 8<sup>h</sup> 0<sup>m</sup> to 8<sup>h</sup> 40<sup>m</sup>. Seeing very fine. The space A B C is too large; that is, the rest of the drawing is crowded, but most of the forms are kept. The central band is of a rose pink, banded in the strands  like a rope and covered with a thin veil of white cloud, whose prevailing shapes are mountain like . The whole drawing is unsatisfactory, but still quite faithful.

Drawing No. 6. 1875, June 23. Observer, Holden. Magnifying power, 400. 8<sup>h</sup> 3<sup>m</sup> to 8<sup>h</sup> 27<sup>m</sup>. Seeing good for first ten minutes, and then grows rapidly worse; drawing not wholly finished. The worst fault in this picture is that the outlines of the parts bordering on the *main* red belt (which is to-night entirely in the north hemisphere) are a little too *prononcés*.

Drawing No. 7. 1875, June 54. Observer, Holden. Magnifying power, 400. Begun 8<sup>h</sup> 15<sup>m</sup>; ended 8<sup>h</sup> 55<sup>m</sup>, *aa'* and *bb'* too far apart. Seeing not first rate. The columnar structure uniting *aa'* and *bb'* is too coarse; these little pillars are bright shining points. General Note on all. Colour of central band in all drawings of *Jupiter*. Try to get it a cross between rose pink and salmon colour.

Drawing No. 8. 1875, July 8. Observer, Holden. Magnifying power, 400. 8<sup>h</sup> 15<sup>m</sup> to 8<sup>h</sup> 50<sup>m</sup>. Tint of *Jupiter* a pale yellowish-white. Tint of bands rosy pink with a dash of salmon colour; the pink of central band looks as if seen through a gauzy white cloud.

Drawing No. 9. 1875, July 13. Observer, Holden. Magnifying power, 400. Emersion of Satellite, I. 16<sup>h</sup> 6<sup>m</sup> 10<sup>s</sup> to 30<sup>s</sup>? by clock. Clock correction = + 16<sup>s</sup>. Drawing begun at 8<sup>h</sup> 40<sup>m</sup>, ended at 8<sup>h</sup> 57<sup>m</sup>. Seeing very poor and planet yellow. The position of the shadow of the satellite is that for 8<sup>h</sup> 40<sup>m</sup>. Whole drawing very unsatisfactory. The general aspect of the planet is not caught, and seeing is too bad to be quite sure of the individual forms. That of the oblique cloud preceding the satellite's shadow is fairly well drawn.

Drawing No. 10. 1875, July 14. Observer, Holden. Magnifying power (probably) 400. Begun at 8<sup>h</sup> 0<sup>m</sup>; ended at 8<sup>h</sup> 27<sup>m</sup>, on account of cloud. Drawing is not completed. The southern quarter is almost an olive green; the northern quarter approaches this tint.

Drawing No. 11. 1875, July 16. Observer, Holden. Magnifying power, 400. Begun 8<sup>h</sup> 32<sup>m</sup>; ended 8<sup>h</sup> 48<sup>m</sup>. Very unsteady. Planet yellow; general appearance of forms between *aa'* and *bb'* like those of June 21 or June 24.